

**SECTION 07321  
CONCRETE ROOF TILES**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Concrete Roof Tiles.
- 2. Underlayment.

- B. Related Sections:

- 1. Division 06 Section "Rough Carpentry" for wood framing.
- 2. Division 07 Section "Sheet Metal Flashing and Trim" for flashings.

1.3 DEFINITION

- A. Roofing Terminology: See ASTM D 1079, glossaries in TRI/WSRCA's "Concrete and Clay Roof Tile Design Criteria Installation Manual for Moderate Climate Regions," and NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For the following products, of sizes indicated, to verify color selected:
  - 1. Concrete Roof Tile: Full size.
  - 2. Accessory Tile: Full size, each type.
  - 3. Fastenings: Wire-tie system components: 12 inches long.

- C. Qualification Data: For qualified Installer.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for concrete roof tiles.
- E. Research/Evaluation Reports: For each type of concrete roof tile required, from the ICC.
- F. Maintenance Data: For each type of concrete roof tile to include in maintenance manuals.
- G. Warranties: Sample of special warranties.
- H. Maintenance Material: Furnish 50 square feet of extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain felt underlayment and self-adhering sheet underlayment from single source from single manufacturer.
- C. Fire-Resistance Characteristics: Where indicated, provide concrete roof tiles and related roofing materials identical to those of assemblies tested for fire resistance per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
  - 1. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.
- D. Preinstallation Conference: Conduct conference at Project site.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double stack rolls.
  - 1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

- B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

#### 1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be performed according to manufacturer's written instructions and warranty requirements.
  - 1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

#### 1.8 WARRANTY

- A. Special Warranty: Standard form in which manufacturer agrees to repair or replace concrete roof tiles that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Manufacturing defects.
  - 2. Material Warranty Period: 50 years from date of Substantial Completion.
- B. Special Project Warranty: Roofing Installer's Warranty, or warranty form at end of this Section, signed by roofing Installer, covering the Work of this Section, in which roofing Installer agrees to repair or replace components of concrete roof tiles that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

- 2.1 CONCRETE ROOF TILES: ASTM C 1492, molded- or extruded-concrete roof tile units of shape and configuration indicated, with integral color, and free of surface imperfections. Provide with fastening holes pre-punched at factory.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide LHC 8710 Ladera Blend manufactured by Eagle Roofing Products or comparable product by one of the following:
    - a. Bartile

- b. Dectile
  - c. Entegra Sales, Inc.
  - d. Hansen Roof Tile
  - e. MonierLifetile LLC
  - f. Staco Architectural Roof Tile
  - g. Vande Hey-Raleigh Mfg., Inc
  - h. Westile Roofing Products
  - i. TAMKO Roofing Products, Inc.
- 2. Weight: Lightweight.
  - 3. High-Profile Shape: Capistrano.
  - 4. Color and Blends: Blend of tan, gray, orange and dark brown.
  - 5. High-Profile-Shape Accessory Tiles: Ridge, ridge end, roll rake edge, starter units, in color matching concrete roof tiles

## 2.2 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- B. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied.
- C. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane-based joint sealant; Type S, Grade NS, Class 25, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O.
- D. Roofing Asphalt: ASTM D 312, Type IV.
- E. Cold-Applied Adhesive: Manufacturer's standard asphalt-based, one or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with underlayments.
- F. Foam Adhesive: Two-component, polyurethane expanding adhesive recommended for application by concrete roof tile manufacturer.
- G. Mortar: ASTM C 270, Type M, with ASTM C 979, pigmented mortar matching the color of concrete roof tiles for exposed-to-view mortar, and natural color for concealed-from-view mortar.
- H. Eave Closure: Manufacturer's standard EPDM eave closure formed to shape of concrete roof tiles.

- I. Ridge Closure: Manufacturer's standard EPDM ridge closure, formed to shape of concrete roof tiles.
- J. Wood Nailers: Beveled Cant Strips and Wood Battens: Comply with requirements for pressure-preservative-treated wood in Section 06100 Rough Carpentry.
  - a. Mesh Fabric: 18-by-14 mesh of PVC-coated, glass-fiber thread

## 2.3 FASTENERS

- A. Roofing Nails: ASTM F 1667, copper, 0.135-inch diameter shank, sharp-pointed, conventional roofing nails with barbed shanks; minimum 3/8-inch-diameter head; of sufficient length to penetrate 3/4 inch into roof-deck sheathing.
  - 1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.
- B. Felt Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel wire with low-profile capped heads or disc caps, 1-inch minimum diameter.
- C. Wood Batten Nails: ASTM F 1667; common or box, steel wire, flat head, and smooth shank.
- D. Wire Ties: Brass, 0.083-inch minimum diameter.
- E. Twisted-Wire-Tie System: Continuously twisted, two-wire unit with loops formed 6 inches apart, minimum 0.1-inch-diameter brass wire and 0.06-inch-diameter brass tie wires, with matching-metal folding clip anchors.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Newport Tool & Fastener Company, Inc.
    - b. Wire Works, Inc.
- F. Hook Nails: One-piece wind lock and concrete roof tile fastener system, minimum 0.1-inch-diameter brass wire, for direct deck nailing.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Newport Tool & Fastener Company, Inc.
    - b. Wire Works, Inc.

- G. Tile Locks: Brass, 0.1-inch-diameter wire device designed to secure butt edges of overlaid concrete roof tiles.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Newport Tool & Fastener Company, Inc.
    - b. Wire Works, Inc.
- H. Storm Clips: Brass strap-type, 0.04-by-1/2-inch, L-shaped retainer clips designed to secure side edges of concrete roof tiles. Provide with two fastener holes in base flange.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Newport Tool & Fastener Company, Inc.
    - b. Wire Works, Inc.

#### 2.4 UNDERLAYMENT MATERIALS

- A. Felt Underlayment: ASTM D 226, Type II, asphalt-saturated organic felt, unperforated.
- B. Felt Underlayment: ASTM D 2626, asphalt-saturated and -coated organic felt, dusted with fine mineral surfacing on both sides, unperforated.
- C. Roll Roofing Underlayment: ASTM D 6380, Class M, Type II, asphalt-saturated and -coated organic felt, mineral-granule surfaced.
- D. Self-Adhering Sheet Underlayment, Granular Surfaced: ASTM D 1970, a minimum of 55-mil-thick sheet; glass-fiber-mat-reinforced, SBS-modified asphalt; mineral-granule surfaced; with release paper backing; cold applied.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ALCO-NVC Inc.
    - b. Atlas Roofing Corporation.
    - c. Carlisle Coatings & Waterproofing, Inc.
    - d. CertainTeed Corporation.
    - e. GAF Materials Corporation.
    - f. Henry Company.
    - g. IKO.
    - h. Johns Manville.

- i. Owens Corning.
- E. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, minimum of 40-mil-thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing; cold applied.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Carlisle Coatings & Waterproofing, Inc.
    - b. Grace, W. R. & Co. - Conn.
    - c. Henry Company.
    - d. Johns Manville.
    - e. Owens Corning.
    - f. Polyguard Products, Inc.
    - g. Protecto Wrap Company.

## 2.5 METAL FLASHING AND TRIM

- A. General: Comply with requirements in Section 07620 "Sheet Metal Flashing and Trim.
- B. Fabricate sheet metal flashing and trim to comply with recommendations that apply to design, dimensions, metal, and other characteristics of the item in SMACNA's "Architectural Sheet Metal Manual."
  - 1. Apron Flashings: Fabricate with lower flange extending a minimum of 4 inches over and 4 inches beyond each side of downslope tile roofing and 6 inches up the vertical surface.
  - 2. Step Flashings: Fabricate with a head lap of 3 inches and a minimum extension of 4 inches both horizontally and vertically.
  - 3. Channel Flashings: Fabricate with vertical surface extending a minimum of 4 inches above the concrete roof tile and 4 inches beneath the tile roofing, with a 1-inch-high vertical return to form a runoff channel.
  - 4. Rake Pan Flashings: Fabricate with vertical surface extending over fascia and 6 inches beneath the tile roofing, with a 1-inch-high vertical return to form a runoff channel.
  - 5. Cricket Flashings: Fabricate with concealed flange extending a minimum of 18 inches beneath upslope tile roofing, 6 inches beyond each side of roof hatch and 6 inches above the roof plane.
  - 6. Drip Edges: Fabricate in lengths not exceeding 10 feet, with 2-inch roof-deck flange and 1-1/2-inch fascia flange with 3/8-inch drip at lower edge.

- C. Vent-Pipe Flashings: ASTM B 749, Type L51121, at least 1/16 inch thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof and extending at least 4 inches from pipe onto roof.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored and that provision has been made for flashings and penetrations through roofing.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 UNDERLAYMENT INSTALLATION**

- A. General: Comply with concrete roof tile manufacturer's written instructions and recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
  - 1. Cover ridge wood nailers with underlayment strips.
- B. Double-Layer Felt/Self-Adhering Sheet Underlayment:
  - 1. Install single layer of felt underlayment on roof deck parallel with and starting at the eaves. Lap sides a minimum of 2 inches over underlying course. Lap ends a minimum of 4 inches. Stagger end laps between succeeding courses at least 72 inches. Fasten with felt underlayment roofing nails.
  - 2. Install self-adhering sheet underlayment, wrinkle free, on felt underlayment. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Lap sides not less than 3-1/2 inches in direction to shed water. Lap ends not less than 6 inches, staggered 24 inches between succeeding courses. Roll laps with roller. Cover underlayment within seven days.



### 3.3 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Section 07620 "Sheet Metal Flashing and Trim."
  - 1. Install metal flashings according to concrete roof tile manufacturer's written instructions and recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Apron Flashings: Extend lower flange over and beyond each side of downslope tile roofing and up the vertical surface.
- C. Step Flashings: Install with a head lap of 3 inches and extend both horizontally and vertically. Install with lower edge of flashing just upslope of, and concealed by, butt of overlying tile. Fasten to roof deck only.
- D. Cricket Flashings: Install against roof-penetrating elements, extending concealed flange beneath upslope tile roofing and beyond each side.
- E. Channel Flashings: Install over underlayment and fasten to roof deck.
- F. Rake Pan Flashings: Install over underlayment and fasten to roof deck.
- G. Rake Drip Edges: Install over underlayment and fasten to roof deck.
- H. Eave Drip Edges: Install beneath underlayment and fasten to roof deck.
- I. Pipe Flashings: Form flashing around pipe penetrations and tile roofing. Fasten and seal to tile roofing.
- J. Sheet Metal Ridge Vents: Install centrally, and mechanically fasten to wood ridge. Adhere each side to concrete roof tile with elastomeric sealant.
  - 1. Install fabric mesh over roof-deck air ventilation gaps to prevent insect entry.

### 3.4 WOOD NAILERS AND BATTENS

- A. Install wood nailers and battens according to TRI Guide Table 1, Table 2, Table 3, MC 04 or MC 05, MC 06, MC 06A.

### 3.5 CONCRETE ROOF TILE INSTALLATION

- A. General: Install concrete roof tiles according to manufacturer's written instructions, to recommendations in TRI/WSRCA's "Concrete and Clay Roof Tile Design Criteria Installation Manual for Moderate Climate Regions," and to NRCA's "The NRCA Roofing and Waterproofing Manual."
1. Maintain uniform exposure and coursing of concrete roof tiles throughout roof.
  2. Extend tiles 2 inches over eave fascia.
  3. Nail Fastening: Drive nails to clear the concrete roof tile so the tile hangs from the nail and is not drawn up.
    - a. Install wire through nail holes of cut tiles that cannot be nailed directly to roof deck and fasten to nails driven into deck.
  4. Wire-Tie Fastening: Install wire-tie systems and fasten concrete roof tiles according to manufacturer's written instructions.
  5. Mortar Setting: Install concrete roof tiles according to TRI/FRSA's "Concrete and Clay Roof Tile Installation Manual.
  6. Install storm clips to capture edges of longitudinal sides of concrete roof tiles and securely fasten to roof deck.
  7. Install concrete roof tile locks to support and lock overlying tile butts to underlying tiles.
  8. Cut and fit concrete roof tiles neatly around roof vents, pipes, ventilators, roof hatches, solar-tubes and other projections through roof. Fill voids with mortar.
  9. Install concrete roof tiles with color blend approved by Architect.
- B. High-Profile Concrete Roof Tile Installation:
1. Install tile eave closure.
  2. Provide minimum 3-inch lap between succeeding courses of concrete roof tiles.
  3. Install roll rake tiles.
  4. Install ridge tiles with laps facing away from prevailing wind. Seal laps with asphalt roofing cement.

### 3.6 ADJUSTING AND CLEANING

- A. Remove and replace damaged or broken concrete roof tiles.
- B. Remove excess concrete roof tiles and debris from Project site.

### 3.7 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS **<Insert name>** of **<Insert address>**, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
1. Owner: **<Insert name of Owner>**.
  2. Address: **<Insert address>**.
  3. Building Name/Type: **<Insert information>**.
  4. Address: **<Insert address>**.
  5. Area of Work: **<Insert information>**.
  6. Acceptance Date: **<Insert date>**.
  7. Warranty Period: **<Insert time>**.
  8. Expiration Date: **<Insert date>**.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
    - a. Lightning;
    - b. Peak gust wind speed exceeding site conditions;
    - c. Fire;
    - d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    - e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    - f. Vapor condensation on bottom of roofing; and
    - g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of the foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this **<Insert day>** day of **<Insert month>**, **<Insert year>**.

1. Authorized Signature: **<Insert signature>**.
2. Name: **<Insert name>**.
3. Title: **<Insert title>**.

**END OF SECTION 07321**